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ABSTRACT

This study is an analysis of the dimensionality of two scales--Mach IV (a 20-item Likert-type) and Mach V (a 20-item forced-choice-type)--commonly used in the measurement of Machiavellianism, a variable which many interpersonal communication researchers view with increasing interest. Data for this investigation was collected from 246 undergraduates enrolled in 18 sections of the basic speech course at the University of Oklahoma in the fall of 1973. A close inspection of the two scales revealed that Mach IVis the more precise of the two scales, and it was recommended that the Mach V scale should be avoided until scoring and other measurement difficulties are resolved. It was also suggested that a shortened form of the Mach IV be used. It was concluded that since the use of summed raw scores per factor did not differ significantly from factor scores, the 4-factor, 13-item Mach IV scale using the raw score method is the most practical and best measure of Machiavellianism available at the present time. (Appendixes include Mach IV questionnaire and Mach V attitude inventory with scoring sheet.) (RB)

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THE MEASUREMENT OF MACHIAVELLIANISM: A FACTOR ANALYTIC AND CORRELATIONAL STUDY OF MACH IV AND MACH V

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THE MEASUREMENT OF MACHIAVELLIANISM: A FACTOR ANALYTIC AND CORRELATIONAL STUDY OF MACH IV AND MACH V

Most communication researchers investigating interpersonal communication would probably agree that the conclusions we have reached and the information which has been collected on interpersonal communication is primarily a result of experimental studies employing measures which are paper and pencil tests. While much data has been collected, a review of this research reveals considerable neglect by many researchers in the degree to which they have blindly accepted and administered measuring instruments. It is not uncommon to find experimenters almost haphazardly putting together several bi-polar adjectives and claiming they have measured source credibility, or administering some measure of personality without knowing anything about its reliability or validity. This is a crucial problem for any area of research, for perpetuation of misinformation does nothing but stifle and retard the advancement of knowledge. Indeed, it appears that many have neglected considering the fact that the value and meaningfulness of our conclusions are in reality no better than the measuring instruments we use.

This study is an analysis of 2 scales commonly used in the measurement of Machiavellianism, a variable which many interpersonal communication researchers have viewed with increasing interest. Introduced initially by Christie and Geis (1968), work with Machiavellianism has generated a body of information which indicates that it may be an important variable in the study of interpersonal communication (Hurt, Young, Landes, and Yates, 1973; Young and Hurt, 1973; Hurt, Yates, and Novak, 1972; Burgoon, 1971; Christie and Geis, 1970). The 2 instruments which have been developed to measure this personality trait are: Mach IV (a 20 item Likert-type scale) and Mach V (a 20 item forced-choice-type scale). A review of the literature indicates that the majority of researchers using the Mach scales have assumed that they are unidimensional instruments; yet a factor analysis of portions of Mach IV, portions of Mach V, and the Anomia scale (Christie and Geis, 1968) as well as a factor analysis of the Mach IV scale, Mach V scale, Anomia scale, and F scale (Christie and Geis, 1970) indicate that these measures of Machiavellianism may indeed be multidimensional. In addition, to our knowledge there has been no investigation of the factor structures of either Mach IV or Mach V where each has been considered individually and in their entirety; therefore, it would appear that the question of dimensionality is a very legitimate research concern. It is also observed that while some have chosen to measure Machiavellianism using only the Mach IV scale (Burgoon, 1971; Weiner, 1973), some have used just the Mach V scale (Guterman, 1970), others have suggested using each scale and proposed that a a subject must score highly on both measures before he is considered to be a high Mach (Harris, 1966; Christie and Geis, 1970), and still others have

treated Mach IV and Mach V as parallel tests (Hurt, Young, Landes and Yates, 1973). All of these different uses of the Mach scales tend to indicate that it is not clear which approach is the best or which is the most effective measure of Machiavellianism.

This study is designed to answer questions concerning the dimensionality of both Mach IV and Mach V and the relationship between the 2 measurements in an effort to clarify some of the issues which have been highlighted. In general, this study seeks to answer 3 major research questions:

1. What are the underlying dimensions of the Mach IV scale?
2. What are the underlying dimensions of the Mach V scale?
3. What is the relationship between the Mach IV and Mach V scales?

Scales

Through a process of item analysis the Mach IV scale (see Appendix A) was created by Christie and Geis (1970) and consists of 20 items selected from an original pool of 71. The items are presented in a standard 6-category Likert format with half of the items reversed. The high Mach responses are scored from "5" to "7" and the low Mach responses are scored from "1" to "3", with "7" and "1" being the highest and lowest Machiavellian responses, respectively. No response is scored a "4". Christie and Geis (1970) suggest that a constant of "20" be added to the total score to create a neutral score of "100". Adding the constant, the lowest possible Mach score is "40" and the highest is "160".

The Mach V scale (see Appendix B) was developed to offset a significant negative correlation (approximately -.40) between the Mach IV scale and Edward's Social Desirability scale (Christie and Geis, 1968, 1970). Using a forced-choice format, the subject must respond to 2 out of 3 possible statements. The subject must choose the statement he agrees with most and the statement he disagrees with most and leave the third statement unmarked. Only one of the statements (the keyed statement) is designed, supposedly, to tap Machiavellian orientation. (The 20 Mach items in the Mach V scale correspond to the 20 items on the Mach IV scale.) The 2 remaining non-keyed statements serve as a matched and buffer item to control for social desirability. The matched item has an independent rating of social desirability equivalent to that of the keyed statement. The buffer item has a social desirability rating which is either higher or lower than that of the keyed and matched statements. If the keyed and matched statements are high in social desirability the buffer is low, and if the keyed and matched statements are low in social desirability the buffer is high. The assumption is that the Machiavellian statement and the matched statement will be more salient than the buffer statement to those persons with the highest and lowest Machiavellian orientations. There are 6 possible combinations of responses to each item on the Mach V scale. For scoring purposes the keyed and

matched statements are the most crucial. Responses which include both the keyed and matched statements are scored either "1" or "7" depending on which statement is chosen as most agreeable and most disagreeable. Responses which include the buffer statement and either the keyed or matched statement are scored either "3" or "5"; therefore, in each case only one possible combination of choices may be scored "1" or "7" while two possible combinations may be scored "3" or "5". (No response is scored a "4" in this study.) Christie and Geis (1970) also suggest the addition of "20" as a constant to the Mach V score, creating a possible range of scores from "40" to "160" and a neutral score of "100".

Subjects and Procedures

The data under consideration in this investigation were collected from undergraduates enrolled in 18 sections of the basic speech course at the University of Oklahoma in the fall of 1973. The Mach IV and Mach V scales were administered separately to each of the sections approximately 10 days apart. There were 246 subjects who responded to both scales, 139 males and 107 females. Only data from subjects who responded to both scales were submitted for analysis.

Data Analysis

The responses to each scale were submitted, independently, to a principal component analysis and varimax rotation. Several criteria were used to select factors for rotation. To be considered for rotation, factors were judged according to the following criteria:

1. The factor must have an eigenvalue of 1.0 or greater.
2. The factor must have at least 1 item loading .50 or greater.
3. The factor must have at least a moderately high lower-bound estimate of reliability.
4. When an asymptotic relationship was observed on a plot of factors and eigenvalues, factors were considered less worthy of rotation.

After rotation, item loadings on the resulting factors were categorized as either strong, medium, weak, or insignificant. Items loading .70 or better on a factor were considered as loading strongly. Item loadings of .50 to .69 were considered medium strength loadings, and loadings of .30 to .49 were considered weak. Loadings of .29 and lower were considered insignificant. In addition, an item was assumed to be impure if its highest loadings were similar on 2 or more factors. Finally, a factor was judged to be significant if at least 2 items had their highest loadings on that factor and those loadings were at least .50.

The second set of analyses were correlational. First, the Pearson r between the subjects' scores and the Mach IV and Mach V scales was computed. Second, Pearson r's were computed for responses to the corresponding items on the 2 measures. Third, in the event that the principal component analyses indicated that the instruments were multidimensional, correlations comparing the underlying dimensions of the Mach IV and Mach V scales would be calculated. The results of the correlational analyses were judged significant at $p < .05$, and the conventionally accepted value of .80 was used as the index of reliability.

Results

The principal component analysis of responses to the Mach IV scale yielded 7 factors with eigenvalues of 1.0 or greater. According to the criteria specified previously, 4 of the factors were selected for rotation. The 4 rotated factors explained 41.35% of the total variance (see Table 1). The first factor explained 12.89% of the variance and contained 4 items with strong or medium loadings (items 7, 6, 10, 9). This factor was labeled "Communication Ethics." The second factor accounted for 12.07% of the variance. This factor included 5 items with medium loadings (items 2, 20, 15, 1, 8) and was labeled "Manipulative Strategies and Assumptions." Factor 3 explained 8.15% of the variance and contained 2 items with strong and medium loadings (items 4, 14). This factor was titled "Dispositions Toward People." Factor 4 accounted for 8.24% of the variance and included 2 items with medium loadings (items 3, 19). This factor was labeled "Moral Behavior." The 7 remaining items either loaded weakly on a single factor (items 12, 13, 17) or loaded weakly on 2 or more factors (items 5, 11, 16, 18).

The principal component analysis of the 20 item Mach V scale produced 10 factors with eigenvalues of 1.0 or greater, and 4 factors were selected for rotation. The 4 rotated factors explained 30.59% of the total variance (see Table 2). Factor 1 accounted for 7.11% of the variance and contained 2 items with medium loadings (items 14, 16). Factor 2 explained 8.09% of the variance and included 3 items with medium loadings (items 18, 7, 20). Factor 3 accounted for 8.13% of the variance and contained 3 items with medium loadings (items 19, 10, 11). Factor 4 explained 7.26% of the variance; however, since this factor included only 1 item with a medium loading (item 15), it was considered not to be a significant factor. The 11 remaining items either loaded weakly on a single factor (items 3, 5) or weakly on 2 or more factors (items 1, 2, 4, 6, 8, 9, 12, 13, 17).

As for the correlational analyses, the overall correlation between Mach IV and Mach V was .583. Correlations between corresponding items on the 2 scales ranged from .109 to .504 (see Table 3); however, none of the correlations approached the previously established reliability criterion level of .80. Since the principal component analyses of Mach IV and Mach V produced several factors, correlations between the factor scores of the underlying dimensions of Mach IV and Mach V were also

computed. Results showed that while approximately half of these correlations were significant at $p < .05$, none reached the .8 reliability criterion.

Discussion

Concerning Mach IV, this analysis definitely indicates that the scale is multidimensional instead of unidimensional in nature, and those who use only the summed values of all 20 items as "the score" for Mach IV are obviously losing as well as confounding information. A better alternative would be to obtain a score for each of the 4 factors and use them as independent components of Machiavellianism. In the same manner that source credibility is divided into competence, character, and at times sociability or dynamism components, Machiavellianism would also appear to merit analysis on the basis of several significant dimensions instead of just one overall, gross measure. However, while the 4 factors this study has produced seem to be rather pure from a measurement point of view, the question of validity and test-retest reliability is not yet resolved. Are these components meaningful, do they reoccur in other studies, and are they really measuring Machiavellianism? The answers to these questions can be discovered only after additional research is undertaken to parcel out the most important factors and those which are the best predictors of certain communication behavior. Perhaps a high Mach will score high on some dimensions and low on others, or it might be that only 2 or 3 factors consistently reoccur while others appear only under certain conditions. By viewing the Mach IV scale as a collection of several components and working on the basis of different factors, these issues can be resolved.

While the Mach IV measure holds the potential for becoming a useful research tool, the results of this study concerning Mach V do not produce the same air of optimism. Since the Mach V rotated factor solution yielded only 3 meaningful factors explaining 23.33% of the variance, and due to the low loadings of items on the factors and the small number of pure items contained in each factor, it would appear that the Mach V scale does not fit the principal component model well. While there is no indication that the scale is unidimensional, trying to interpret the factors which are produced is virtually impossible. Since the score for each of the 20 items on the measure is a function of some combination of 3 different statements, it is hard to determine what communalities contributed to the formation of the various factors. Many of the problems of the scale appear to be an artifact of the scoring procedure, an issue which will be considered in more detail later.

Regarding the relationship between Mach IV and Mach V, the results indicate that these measures probably should not be used as parallel forms. It is important to realize that even though the overall correlation between the measures is significant ($r = .583$), only 34% of the variance is commonly shared. If we view this correlation as a reliability index for parallel forms

of a test, the relationship is at best moderate. It should also be realized that the overall correlation between the 2 scales is really not very meaningful since it assumes the measures are unidimensional, an assumption this study tends to discredit.

Since each item in Mach IV has a corresponding item in Mach V, another source of comparison is made available by correlating these corresponding items. Table 3 reveals that all but one of the 20 correlations between these items achieved significance; however, the highest correlation was only .504, explaining 25% of the variance for that item. Again the criterion reliability level of .80 was not achieved; therefore, we must conclude that none of the 20 matching items can legitimately be viewed as reliable parallel forms.

In terms of comparing the underlying dimensions of Mach IV and Mach V, the results of this study clearly indicate that the 2 scales bear little relationship. A comparison of the factor structures of the scales reveals that very few of the corresponding items load on the same factors. For example, on Factor 2 of Mach IV the highest loading items are items 2, 20, 15, 1, and 8. The corresponding items on the Mach V scale are 4, 1, 9, 3, and 13; however, none of these items are loaded on Factor 2 or as a unit load on any of the remaining 3 factors of Mach V but are randomly dispersed among the other factors. The same general pattern occurs for the other corresponding items across the 2 scales. It is also interesting to observe that the keyed statement on items 12, 16, 7, and 11 of Mach V all clearly deal with the issue of "honesty," yet these items are loaded on 3 separate factors. In contrast, the corresponding items on Mach IV (items 7, 6, 10, 9) load highly on just one factor of Mach IV. At least in this one case it is clear what Mach IV is measuring but not at all clear what Mach V is measuring.

The 2 scales can also be compared by correlating their underlying factors. Using the factor scores generated from the respective principal component analyses, the correlation matrix presented in Table 4 shows that indeed there is a significant relationship between several of the factors of Mach IV and Mach V. While this demonstrates some degree of communality (a finding which should be expected), these results also indicate that the Mach scales and their respective factors measure different constructs. The 2 largest correlations between the factors accounted for only 14% and 9% of the variance, and it is quite obvious that none of these underlying factors can be viewed as parallel forms.

These findings regarding the relationship between Mach IV and Mach V can be interpreted several different ways. It could be concluded that one of the measures is indeed a multidimensional instrument which correctly measures the variable under consideration while the other instrument is more inferior in its measurement. Another possible alternative would be that both measures are multidimensional instruments, each measuring the same variable equally well, but each tapping different dimensions of that variable.

Finally, it might be concluded that neither scale measures the variable under consideration and that both are measuring some unknown entity. Obviously these are questions of validity as well as reliability, and while this study is not prepared to provide the final answer, there is considerable evidence to indicate that the first of these possible interpretations is probably the closest to being correct (with Mach IV being the better scale).

The primary weakness of Mach V appears to be a result of its forced-choice nature and the scoring procedure which is used. In an effort to control for social desirability, each item on the scale contains 3 statements, only one of which is the Machiavellian response. Subjects must choose the statement they agree with the most and the statement they disagree with the most. Based on which one of the 6 possible combinations is selected, a value of "1," "3," "5," or "7" is given for that item. However, there is not an equal probability for obtaining these values since two of the possible combinations are scored "3," two are scored "5," one is scored "1," and one is scored "7." Since this scoring procedure does not discriminate between each individual response, information is lost. Also, this tends to make the scale greatly weighted toward a score of "3" or "5," and the effects of this scoring procedure are reflected in the mean scores of the items, which are tightly clustered around the middle of the "1" to "7" range, and in the standard deviation scores, which are very small. Of the 20 Mach V items measured in this study, 16 had a mean between 3.5 and 4.5 and 14 of the standard deviations ranged from 1.4 to 1.6. In comparison the Mach IV items had a much broader range of means (from 2.1 to 5.2) and a slightly broader range in standard deviations (from 1.4 to 2.1). It is also interesting to observe that the Mach V scale contains several unusual scoring possibilities, with some being only remotely related to Machiavellianism. For example, since there are 2 possible combinations of statements in each item which may be scored "5" (with one combination containing the Machiavellian statement and one combination not containing the Machiavellian statement), it is possible for a subject to receive a score of "5" on each item, thus receiving a total score of "120" which indicates high Machiavellianism, but never respond to any of the Machiavellian statements. Interpreting this score as high in Machiavellianism would obviously be misleading.

In general, it is concluded that while the Mach V scale is a multidimensional instrument, in terms of measuring a Machiavellian orientation, the items which comprise the respective dimensions do not appear to be conceptually interrelated. This inability to parcel out interpretable factors seems to be a function of the 6 possible combinations of statements per item (where the answer is based on 2 instead of just one response) and the unequally weighted scoring procedure. It is therefore concluded that even though Mach V might possibly be measuring several important dimensions of Machiavellianism, we are not at all sure what those dimensions are or how they are related to a Machiavellian orientation.

Suggestions for Measuring Machiavellianism

Until the scoring difficulties of Mach V are resolved, it would appear that researchers should avoid using the Mach V scale. Despite its supposed advantage of controlling for social desirability, this study casts serious doubt as to what exactly the Mach V scale is measuring. In an effort to correct some of its deficiencies, alternative methods for using and scoring Mach V have been suggested by Guterman (1970) and Rogers and Semin (1973). Guterman takes 12 of the Mach V items, eliminates the buffer statement, and scores each item on the basis of whether the subject chooses or rejects the Machiavellian statement. Rogers and Semin take all 20 items, have subjects rank order the 3 statements in each item, and use the rank of the Machiavellian statement as the score for that item. While these methods might prove to be improvements, additional research is needed to further clarify how well and reliably they measure Machiavellianism.

Regarding Mach IV, since the variance explained in the principal component analysis is considerable and since the nature of the factors which were produced are relatively pure with high loadings, this measure more readily lends itself to a clearer interpretation than does Mach V and seems to be a superior measuring instrument. On a face validity basis it appears to tap the constructs suggested by the theory related to the Machiavellian personality; however, a close observation of the principal component analysis and the factors which were generated reveals that the Mach IV measure does have several weaknesses. Only 13 of the original 20 items appear to be meaningful and load moderately or highly on the 4 factors. In an effort to shed more light on the nature of these dimensions and the most important items, an additional principal component analysis with varimax rotation was run using just the 13 most highly loading items. The results of this analysis also revealed 4 factors, each containing the same items which were present in the principal component analysis of the 20 item Mach IV scale (see Table 5). In addition the 13 item solution explained even more of the total variance (54% compared to 41% for the 20 item analysis) and the loadings for all the items except one were increased. It was also observed that by reducing the scale to 13 items the variance per factor was greatly reduced (see Table 10). Therefore, since this reduced version of the Mach IV scale contains the same number of factors as the full 20 item scale, accounts for a larger amount of the variance in the principal component analysis, and tends to substantially reduce the variance on each factor, it is our suggestion that the 4 dimensions of the 13 item Mach IV scale be used instead of the original 20 item instrument. In addition it is also suggested that since some of the factors contain only a few items, more research should be employed to devise additional and perhaps better items.

Since the researcher always wants as meaningful and true a score as possible, the procedure used in quantitatively scoring the items is of crucial importance. The question of how the reduced version of the Mach IV scale should be scored is the

final issue this study investigates. With each of the 4 factors of the Mach IV measure, 2 scoring options were considered: (1) using the raw score values or (2) using the factor scores which were produced from the 13 item principal component analysis. The raw scores approach would be much easier to calculate and use, but since the factor scores are weighted so as to maximally explain the variance and since they are independent of other factors, the factor score approach is obviously the better alternative. The real question, therefore, is how well does the raw score method compare to the factor score approach. In an effort to clarify this issue, the sum of the raw scores for each of the 4 factors produced in the 13 item Mach IV analysis was correlated with the factor scores for that factor. Table 6 reveals that the correlations for the 4 factors were .96, .96, .93, and .91. In addition a correlation matrix of summed averaged raw scores per factor indicated that 2 of the 6 correlations were significant at the .05 level, but only 5% and 8% of the variance was explained by these 2 significant correlations.(see Table 7). Since a correlation matrix of factor scores per factor would show all zero correlations between the factors (that is, in an orthogonal solution), it would appear that even with 2 significant correlations, using the raw score method produces differences which are trivial. Based on the high correlation of raw scores with factor scores and the negligible differences between the raw score correlation matrix of factors and the factor score correlation matrix of factors, it is concluded that you do not gain significantly more information by using the factor scores as the unit for analysis, but that the summed raw scores per factor have approximately the same degree of precision.

As a further check of this conclusion, the same procedure (of correlating the raw scores per factor with the corresponding factor scores) was carried out using the 4 factors of the 20 item Mach IV scale. Tables 8 and 9 show approximately the same findings as with the 13 item solution except there appears to be less precision. These results not only reaffirm the validity of using the raw score method but also point out the efficiency of the 13 item Mach IV scale in comparison to the 20 item scale.

As a final observation it should be mentioned that by no means is this study the final word on how Machiavellianism should be measured. While these findings tend to indicate that Mach IV is probably a better index of Machiavellianism, that is not to say it is the only scale which should be used or that Mach V has nothing to do with Machiavellianism. Much more research is needed before any really conclusive answers can be drawn. It is our desire that this research piece be viewed merely as a set of tentative conclusions. We have sought only to critically observe the state of measurement as it presently exists, showing certain strengths and weaknesses in an effort to generate a more true and precise measure of Machiavellianism.

Summary

This study was designed to investigate the measurement of Machiavellianism, a variable which has received increased attention by many involved in interpersonal communication research. Using Christie's Mach IV and Mach V scales, this investigation was concerned with three primary research questions:

1. What are the underlying dimensions of Mach IV?
2. What are the underlying dimensions of Mach V?
3. What is the relationship between Mach IV and Mach V and their underlying dimensions?

Using a principal component analysis with varimax rotation, the Mach IV scale generated 4 factors which were considered meaningful, and these were labeled "Communication Ethics," "Manipulative Strategies and Assumptions," "Dispositions Toward People," and "Moral Behavior." These 4 factors accounted for 41% of the variance. The Mach V scale produced 3 factors which accounted for 24% of the variance; however, these factors were left unnamed due to an inability to find communalities within the factors. Regarding the relationship between Mach IV and Mach V, it was concluded that the scales were not reliable parallel forms. In addition, correlations between the underlying dimensions of Mach IV and Mach V yielded only slightly significant values. A close inspection of the two scales revealed that Mach IV is probably the better instrument and it was recommended that the Mach V scale should be avoided until scoring and other measurement difficulties are resolved. It was also suggested that a shortened form of Mach IV be used. This 13 item instrument was submitted to a principal component analysis and produced the same 4 factors as the full 20 item scale but explained even more of the variance (54%). It was also concluded that since the use of summed raw scores per factor did not differ significantly from factor scores, the 4 factor 13 item Mach IV scale using the raw score method was the most practical and best measure of Machiavellianism we have at present.

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Table 1

Rotated Factor Loadings for Mach IV

Items	Factor 1 Communication Ethics	Factor 2 Manipulative Strategies and Assumptions	Factor 3 Dispositions Toward People	Factor 4 Moral Behavior
1	.001	.540	-.126	.059
2	.282	.591	-.018	-.168
3	.195	-.031	.069	.624
4	-.035	.197	.758	-.104
5	-.361	.384	.146	.436
6	.751	.111	.036	.311
7	.768	.093	-.100	.251
8	-.287	.519	.298	.143
9	.521	.315	.033	.132
10	.620	.209	.139	-.161
11	.430	-.042	.351	.138
12	.189	.469	.214	.225
13	.136	.400	.008	.053
14	.185	-.109	.647	.153
15	.103	.551	-.343	.171
16	.366	-.038	.308	-.081
17	.028	-.050	.271	.357
18	.130	.370	-.027	.394
19	.048	.102	-.114	.615
20	.026	.552	.072	-.116
Variance	2.578	2.414	1.629	1.649
% of Total Var.	12.89	12.07	8.15	8.24
Cum. % of Var.	12.89	24.96	33.11	41.35

Table 2

Rotated Factor Loadings for Mach V

Items	Factor 1	Factor 2	Factor 3	Factor 4
1	-.249	.058	.090	.275
2	.123	-.067	.214	.309
3	-.041	-.009	.049	.417
4	-.003	.170	.376	.253
5	-.451	.174	.029	.136
6	-.028	.340	-.117	.302
7	-.255	.562	-.066	.013
8	.349	-.026	.358	-.179
9	.049	-.194	.274	.286
10	-.125	-.033	.586	-.086
11	.193	.103	.539	.010
12	.225	.365	.344	.232
13	.022	-.059	-.020	.252
14	-.640	.205	.066	-.208
15	-.038	.017	-.076	.604
16	.537	.406	.194	.227
17	.062	.294	-.027	.326
18	-.022	.594	.145	-.337
19	-.367	-.164	.619	-.009
20	-.090	.509	-.009	-.120
Variance	1.422	1.617	1.625	1.451
% of Total Var.	7.11	8.09	8.13	7.26
Cum. % of Var.	7.11	15.20	23.33	30.59

Table 3

Correlations Between Corresponding Items in Mach IV and Mach V

Items on Mach IV	Items on Mach V	r *	r^2
1	3	.244	.059
2	4	.375	.141
3	8	.299	.089
4	5	.373	.139
5	19	.164	.027
6	16	.421	.177
7	12	.351	.124
8	13	.222	.049
9	11	.310	.096
10	7	.174	.030
11	6	.163	.027
12	20	.229	.052
13	10	.340	.115
14	14	.190	.036
15	9	.412	.169
16	17	.164	.027
17	18	.109	.012
18	15	.237	.056
19	2	.504	.254
20	1	.287	.082

*All correlations are significant at $p < .05$ (where r= .125 for a N size of 246) except for the correlation between item 17 of Mach IV and item 18 of Mach V.
The overall correlation between Mach IV and Mach V is .583, r^2= .340.

Table 4

Correlation Matrix of Mach IV and Mach V Factors

		Mach IV Factors			
		1	2	3	4
Mach V Factors	1	.201*	.019	-.304*	.111
	2	.374*	.043	.178*	.107
	3	.190*	.274*	-.019	.212*
	4	.147*	.315*	.088	.021

*Significant at $p < .05$ (where $r = .125$ for a N size of 246)

Table 5

Rotated Factor Loadings for the Shortened Mach IV Scale

Items	Factor 1 Communication Ethics	Factor 2 Manipulative Strategies and Assumptions	Factor 3 Dispositions Toward People	Factor 4 Moral Behavior
1	.119	.556	-.088	.035
2	.418	.549	.018	-.260
3	.197	-.010	.050	.671
4	-.033	.195	.786	-.018
6	.794	-.010	.041	.274
7	.797	-.027	-.085	.222
8	-.145	.584	.286	.045
9	.565	.220	.116	.192
10	.702	.075	.117	-.275
14	.178	-.150	.727	.133
15	.154	.578	-.397	.156
19	.058	.132	-.012	.740
20	-.001	.617	.090	.089
Variance	2.386	1.798	1.441	1.354
% of Total Var.	18.36	13.83	11.09	10.42
Cum. % of Var.	18.36	32.19	43.28	53.70

Table 6

Correlations Between Summed Raw Scores and Corresponding Factor Scores for the Shortened Mach IV Scale

Factors	r	r^2
1	.964*	.930
2	.965*	.931
3	.932*	.869
4	.916*	.839

Table 7

Correlation Matrix of Averaged Raw Scores per Factor for the Shortened Mach IV Scale

Factors	1	2	3	4
1	1.0			
2	.234*	1.0		
3	.113	.030	1.0	
4	.288*	.116	.073	1.0

*Significant at $p < .05$ (where r= .125 for a N size of 246)

Table 8

Correlations Between Summed Raw Scores and Corresponding Factor Scores for the Mach IV Scale

Factors	r*	r^2
1	.914*	.836
2	.954*	.911
3	.865*	.749
4	.895*	.802

Table 9

Correlation Matrix of Averaged Raw Scores per Factor for the Mach IV Scale

Factors	1	2	3	4
1	1.0			
2	.256*	1.0		
3	.189*	.088	1.0	
4	.236*	.320*	.108	1.0

*Significant at $p < .05$ (where r= .125 for a N size of 246)

Table 10

Means, Variances, and Standard Deviations for Mach IV and Mach V and their Underlying Dimensions

Scale	Mean	Variance	Standard Deviation
Mach IV (20 items)			
Overall	92.80	208.77	14.45
Factor 1 (items 7,6,10,9,11,16)	21.44	45.97	6.78
Factor 2 (items 2,20,15,1,8,12,13)	22.06	52.29	7.23
Factor 3 (items 4,14)	7.12	6.98	2.64
Factor 4 (items 3,19,17,5,18)	22.18	25.70	5.07
Mach IV (13 items)			
Overall	43.98	109.15	10.45
Factor 1 (items 7,6,10,9)	11.89	27.79	5.27
Factor 2 (items 2,20,15,1,8)	15.80	33.23	5.77
Factor 3 (items 4,14)	7.12	6.98	2.64
Factor 4 (items 3,19)	9.16	8.78	2.96
Mach V (20 items)			
Overall	102.64	82.66	9.09
Factor 1 (items 14,16,5)	11.28	6.38	2.53
Factor 2 (items 18,7,20,6,12)	21.90	19.11	4.37
Factor 3 (items 19,10,11,4,8)	20.50	15.46	3.93
Factor 4 (items 15,3,2,13,17,9,1)	28.97	21.01	4.58

Appendix A

Mach IV

Please provide the following information:

male_____ female_____ Section_____ Instructor_____

Social Security Number 000-00-_____

This questionnaire is an opinion survey designed to see how Speech 111 students feel about issues we frequently hear and express. Listed below are a number of statements. Each represents a commonly held opinion and there are no right or wrong answers. You will probably disagree with some items and agree with others. We are interested in the extent to which you agree or disagree with such matters of opinion.

Read each statement carefully. Then indicate the extent to which you agree or disagree by circling the number following each statement. The numbers and their meaning are indicated below:

If you agree strongly, circle 3
If you agree somewhat, circle 2
If you agree slightly, circle 1

If you disagree slightly, circle -1
If you disagree somewhat, circle -2
If you disagree strongly, circle -3

First impressions are usually best in such matters. Read each statement, decide if you agree or disagree and the strength of your opinion, and then circle the appropriate number following the statement. Give your opinion on each statement.

If you find that the numbers to be used in answering do not adequately indicate your own opinion, use the one which is closest to the way you feel.

1. Never tell anyone the real reason you did something unless it is useful to do so.
   3 2 1 -1 -2 -3
2. The best way to handle people is to tell them what they want to hear.
   3 2 1 -1 -2 -3
3. One should take action only when sure it is morally right.
   3 2 1 -1 -2 -3
4. Most people are basically good and kind.
   3 2 1 -1 -2 -3
5. It is safest to assume that all people have a vicious streak and it will come out when they are given a chance.
   3 2 1 -1 -2 -3

6. Honesty is the best policy in all cases.
3 2 1 -1 -2 -3

7. There is no excuse for lying to someone else.
3 2 1 -1 -2 -3

8. Generally speaking, men won't work hard unless they're forced to do so.
3 2 1 -1 -2 -3

9. All in all, it is better to be humble and honest than to be important and dishonest.
3 2 1 -1 -2 -3

10. When you ask someone to do something for you, it is best to give the real reasons for wanting it rather than giving reasons which carry more weight.
3 2 1 -1 -2 -3

11. Most people who get ahead in the world lead clean, moral lives.
3 2 1 -1 -2 -3

12. Anyone who completely trusts anyone else is asking for trouble.
3 2 1 -1 -2 -3

13. The biggest difference between most criminals and other people is that the criminals are stupid enough to get caught.
3 2 1 -1 -2 -3

14. Most men are brave.
3 2 1 -1 -2 -3

15. It is wise to flatter important people.
3 2 1 -1 -2 -3

16. It is possible to be good in all respects.
3 2 1 -1 -2 -3

17. Barnum was wrong when he said that there's a sucker born every minute.
3 2 1 -1 -2 -3

18. It is hard to get ahead without cutting corners here and there.
3 2 1 -1 -2 -3

19. People suffering from incurable diseases should have the choice of being put painlessly to death.
3 2 1 -1 -2 -3

20. Most men forget more easily the death of their father than the loss of their property.
3 2 1 -1 -2 -3

Appendix B

Mach V and Score Sheet

Section_____ Instructor_____ male____ female____

Social Security Number 000-00-_____

Attitude Inventory

You will find 20 groups of statements listed below. Each group is composed of three statements. Each statement refers to a way of thinking about people or things in general. They reflect opinions and not matters of fact -- there are no "right" or "wrong" answers and different people have been found to agree with different statements.

Please read each of the three statements in each group. Then decide first which of the statements is most true or comes the closest to describing your own beliefs. Circle a plus (+) in the space provided to the right of that statement.

Then decide which of the remaining two statements is most false or is the farthest from your own beliefs. Circle the minus (-) in the space provided to the right of that statement.

In each group of statements you will leave one statement unmarked.

Here is an example:

	Most True	Most False
A. It is easy to persuade people but hard to keep them persuaded.	+	-
B. Theories that run counter to common sense are a waste of time.	(+)	-
C. It is only common sense to go along with what other people are doing and not be too different.	+	(-)

In this case, statement B would be the one you believed in most strongly and A and C would be ones that are not as characteristic of your opinion. Statement C would be the one you believe in least strongly and is least characteristic of your beliefs.

You will find some of the choices easy to make; others will be quite difficult. Do not fail to make a choice no matter how hard it may be. You will mark two statements in each group of three -- the one that comes the closest to your own beliefs with a + and the one farthest from your beliefs with a -. The remaining statement should be left unmarked.

Please do not omit any groups of statements.

	Most True	Most False
1. A. It takes more imagination to be a successful criminal than a successful business man.	+	-
B. The phrase "the road to hell is paved with good intentions" contains a lot of truth.	+	-
C. Most men forget more easily the death of their father than the loss of their property.	+	-
2. A. Men are more concerned with the car they drive than with the clothes their wives wear.	+	-
B. It is very important that imagination and creativity in children be cultivated.	+	-
C. People suffering from incurable diseases should have the choice of being put painlessly to death.	+	-
3. A. Never tell anyone the real reason you did something unless it is useful to do so.	+	-
B. The well-being of the individual is the goal that should be worked for before anything else.	+	-
C. Once a truly intelligent person makes up his mind about the answer to a problem he rarely continues to think about it.	+	-
4. A. People are getting so lazy and self-indulgent that it is bad for our country.	+	-
B. The best way to handle people is to tell them what they want to hear.	+	-
C. It would be a good thing if people were kinder to others less fortunate than themselves.	+	-
5. A. Most people are basically good and kind.	+	-
B. The best criteria for a wife or husband is compatibility--other characteristics are nice but not essential.	+	-
C. Only after a man has gotten what he wants from life should he concern himself with the injustices in the world.	+	-
6. A. Most people who get ahead in the world lead clean, moral lives.	+	-
B. Any man worth his salt shouldn't be blamed for putting his career above his family.	+	-
C. People would be better off if they were concerned less with how to do things and more with what to do.	+	-
7. A. A good teacher is one who points out unanswered questions rather than gives explicit answers.	+	-
B. When you ask someone to do something for you, it is best to give the real reasons for wanting it rather than giving reasons which might carry more weight.	+	-
C. A person's job is the best single guide as to the sort of person he is.	+	-

		Most True	Most False
8.	A. The construction of such monumental works as the Egyptian pyramids was worth the enslavement of the workers who built them.	+	-
	B. Once a way of handling problems has been worked out it is best to stick to it.	+	-
	C. One should take action only when sure that it is morally right.	+	-
9.	A. The world would be a much better place to live in if people would let the future take care of itself and concern themselves only with enjoying the present.	+	-
	B. It is wise to flatter important people.	+	-
	C. Once a decision has been made, it is best to keep changing it as new circumstances arise.	+	-
10.	A. It is a good policy to act as if you are doing the things you do because you have no other choice.	+	-
	B. The biggest difference between most criminals and other people is that criminals are stupid enough to get caught.	+	-
	C. Even the most hardened and vicious criminal has a spark of decency somewhere within him.	+	-
11.	A. All in all, it is better to be humble and honest than to be important and dishonest.	+	-
	B. A man who is able and willing to work hard has a good chance of succeeding in whatever he wants to do.	+	-
	C. If a thing does not help us in our daily lives, it isn't very important.	+	-
12.	A. A person shouldn't be punished for breaking a law which he thinks is unreasonable.	+	-
	B. Too many criminals are not punished for their crime.	+	-
	C. There is no excuse for lying to someone else.	+	-
13.	A. Generally speaking, men won't work hard unless they're forced to do so.	+	-
	B. Every person is entitled to a second chance, even after he commits a serious mistake.	+	-
	C. People who can't make up their minds aren't worth bothering about.	+	-
14.	A. A man's first responsibility is to his wife, not his mother.	+	-
	B. Most men are brave.	+	-
	C. It's best to pick friends that are intellectually stimulating rather than ones it is comfortable to be around.	+	-
15.	A. There are very few people in the world worth concerning oneself about.	+	-
	B. It is hard to get ahead without cutting corners here and there.	+	-
	C. A capable person motivated for his own gain is more useful to society than a well-meaning but ineffective one.	+	-

		Most True	Most False
16.	A. It is best to give others the impression that you can change your mind easily.	+	-
	B. It is a good working policy to keep on good terms with everyone.	+	-
	C. Honesty is the best policy in all cases.	+	-
17.	A. It is possible to be good in all respects.	+	-
	B. To help oneself is good; to help others even better.	+	-
	C. War and threats of war are unchangeable facts of human life.	+	-
18.	A. Barnum was probably right when he said that there's at least one sucker born every minute.	+	-
	B. Life is pretty dull unless one deliberately stirs up some excitement.	+	-
	C. Most people would be better off if they controlled their emotions.	+	-
19.	A. Sensitivity to the feelings of others is worth more than poise in social situations.	+	-
	B. The ideal society is one where everybody knows his place and accepts it.	+	-
	C. It is safest to assume that all people have a vicious streak and it will come out when they are given a chance.	+	-
20.	A. People who talk about abstract problems usually don't know what they are talking about.	+	-
	B. Anyone who completely trusts anyone else is asking for trouble.	+	-
	C. It is essential for the functioning of a democracy that everyone votes.	+	-

Mach V Scoring Sheet

Points per Item by Response Patterns

Items	1	3	5	7
1	A+	B+ A+	B+ C+	C+
	C-	C- B-	A- B-	A-
2	A+	B+ A+	B+ C+	C+
	C-	C- B-	A- B-	A-
3	C+	B+ C+	B+ A+	A+
	A-	A- B-	C- B-	C-
4	A+	C+ A+	C+ B+	B+
	B-	B- C-	A- C-	A-
5	A+	C+ A+	C+ B+	B+
	B-	B- C-	A- C-	A-
6	A+	B+ A+	B+ C+	C+
	C-	C- B-	A- B-	A-
	B+	C+ B+	C+ A+	A+
	A-	A- C-	B- C-	B-
8	C+	A+ C+	A+ B+	B+
	B-	B- A-	C- A-	C-
9	C+	A+ C+	A+ B+	B+
	B-	B- A-	C- A-	C-
10	A+	C+ A+	C+ B+	B+
	B-	B- C-	A- C-	A-
11	A+	C+ A+	C+ B+	B+
	B-	B- C-	A- C-	A-
12	C+	A+ C+	A+ B+	B+
	B-	B- A-	C- A-	C-
13	C+	B+ C+	B+ A+	A+
	A-	A- B-	C- B-	C-
14	B+	A+ B+	A+ C+	C+
	C-	C- A-	B- A-	B-
15	C+	A+ C+	A+ B+	B+
	B-	B- A-	C- A-	C-
16	C+	A+ C+	A+ B+	B+
	B-	B- A-	C- A-	C-
17	A+	B+ A+	B+ C+	C+
	C-	C- B-	A- B-	A-

Items	1	3	5	7
18	C+	B+ C+	B+ A+	A+
	A-	A- B-	C- B-	C-
19	B+	A+ B+	A+ C+	C+
	C-	C- A-	B- A-	B-
20	A+	C+ A+	C+ B+	B+
	B-	B- C-	A- C-	A-

Sum all 20 items and add a constant of 20. The range is 40 to 160 with a neutral score of 100.